Fig. 1

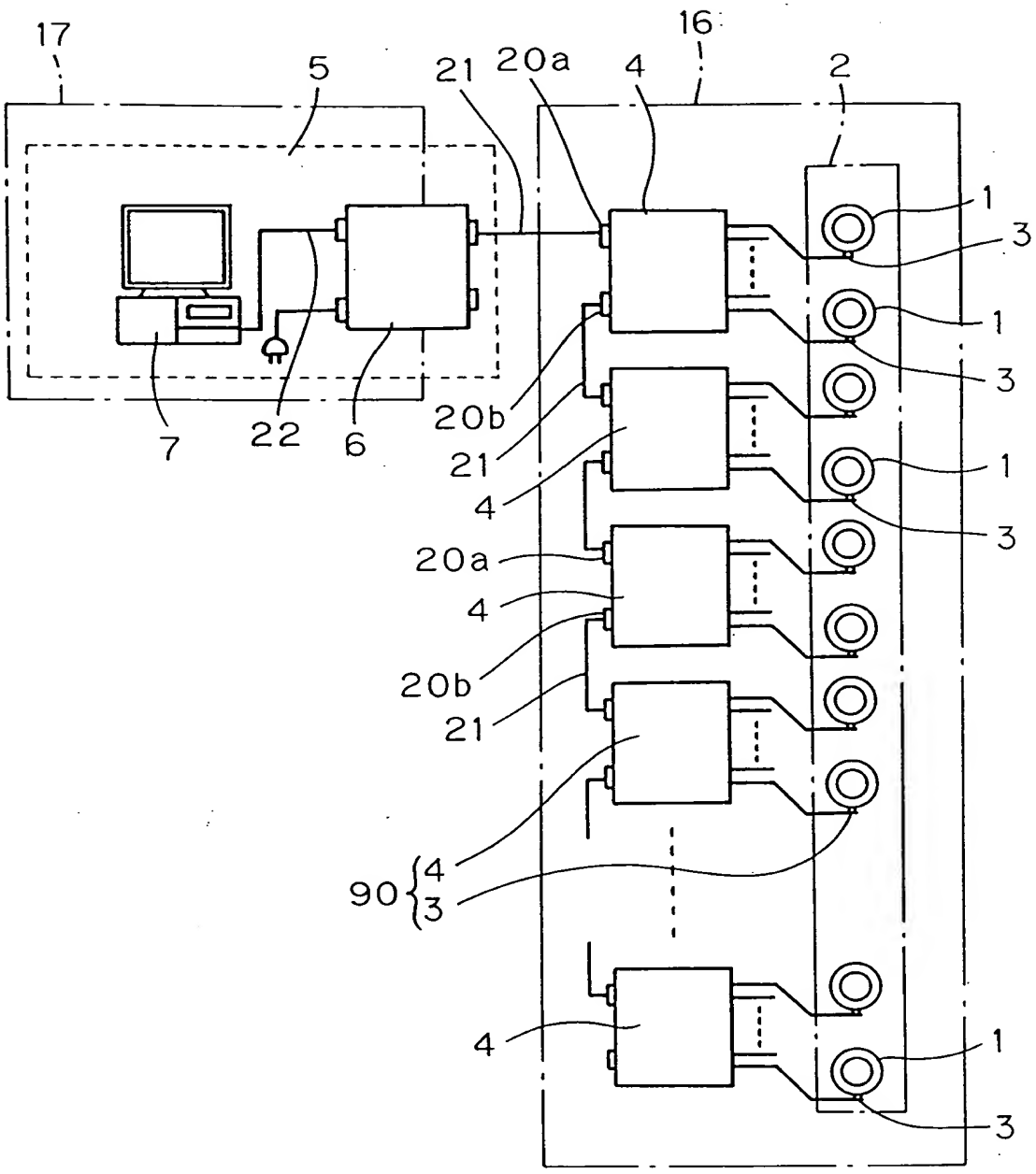


Fig.2

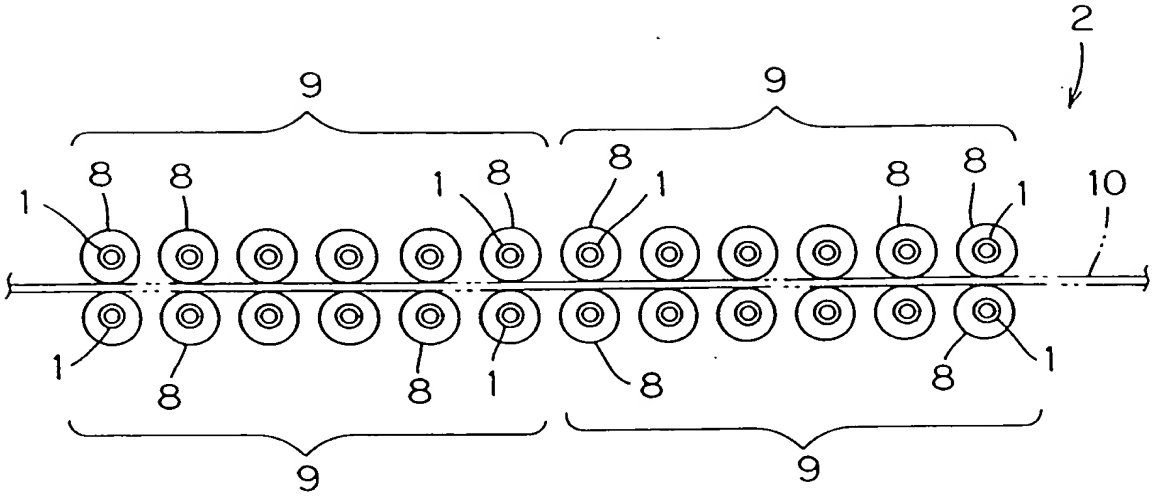


Fig.3

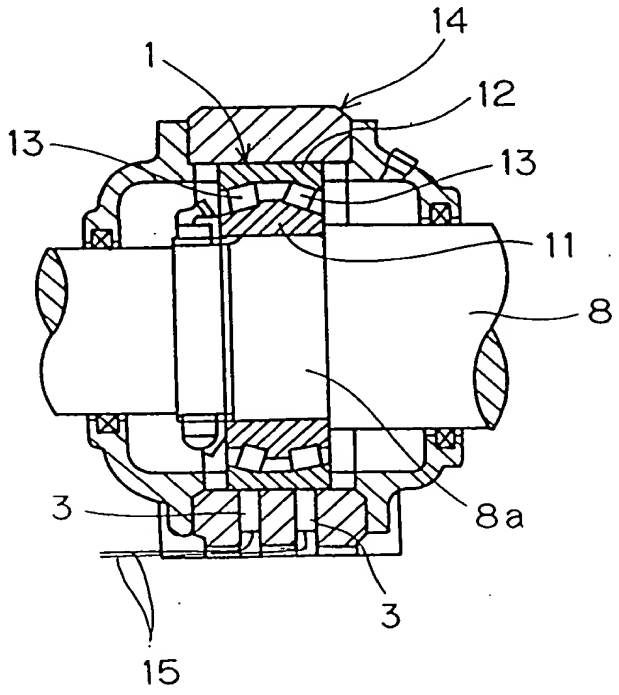


Fig.4

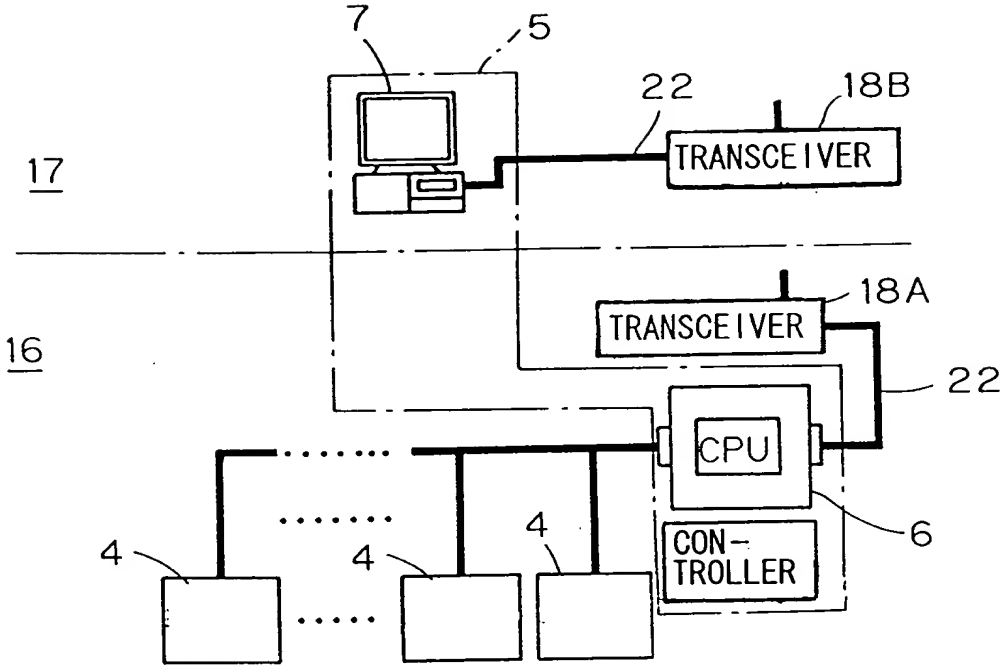

7
5
22
18B
TRANSCEIVER
17
18A
TRANSCEIVER
16
22
CPU
6
CON-
TROLLER
4
4
4

Fig.5

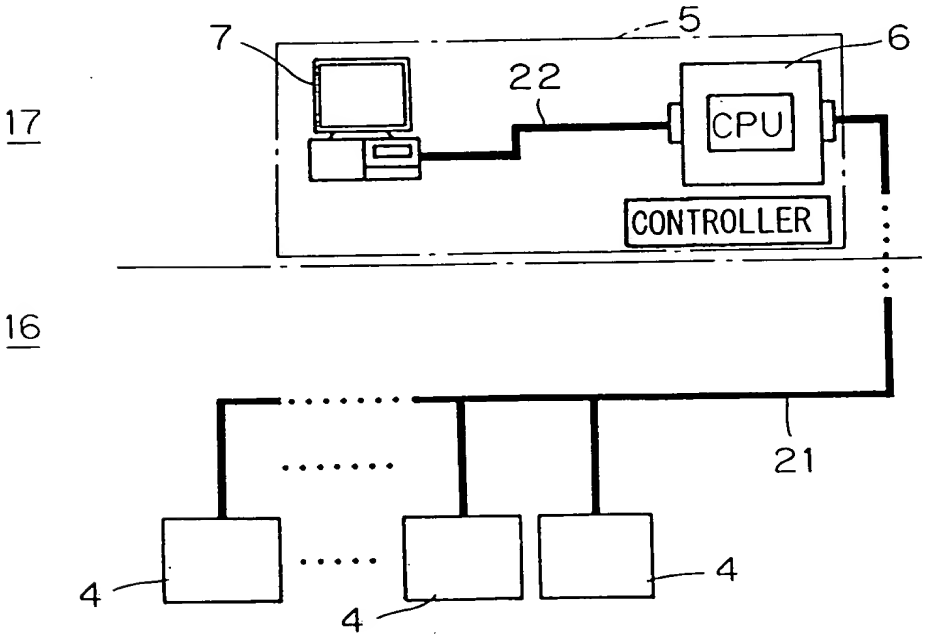

7
5
6
22
CPU
17
CONTROLLER
16
21
4
4
4

Fig. 6

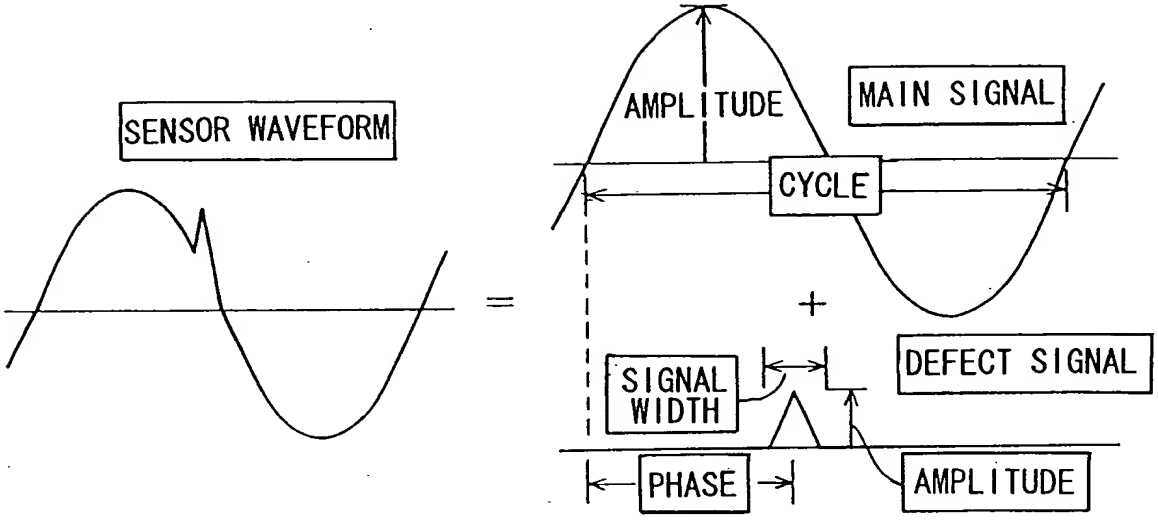

SENSOR WAVEFORM
=
AMPLITUDE
MAIN SIGNAL
CYCLE
+
SIGNAL WIDTH
DEFECT SIGNAL
PHASE
AMPLITUDE

Fig. 7

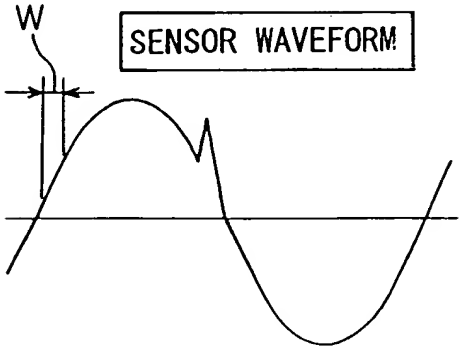

W
SENSOR WAVEFORM

Fig.8

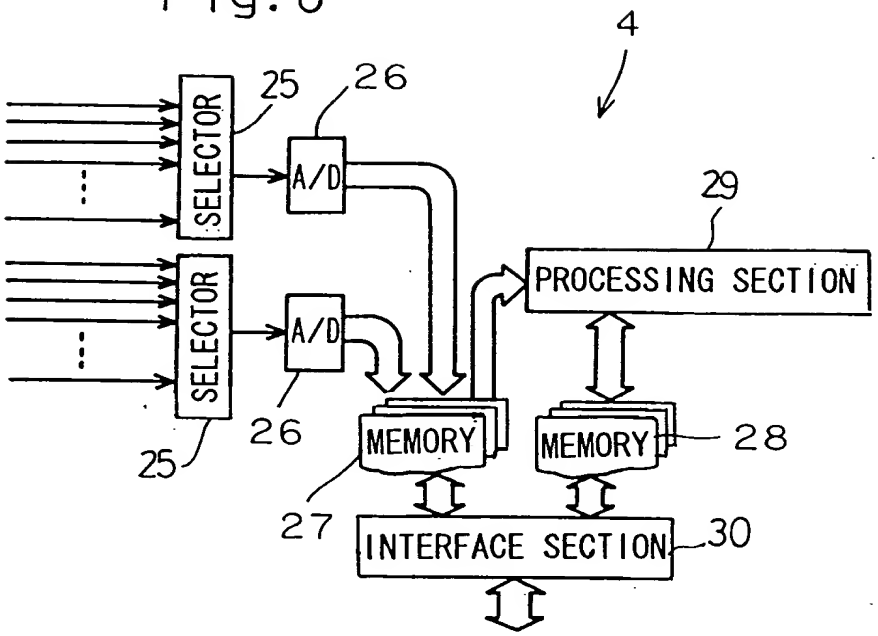

4
25
26
SELECTOR
A/D
SELECTOR
A/D
25
26
29
PROCESSING SECTION
MEMORY
MEMORY
28
27
INTERFACE SECTION
30

Fig.9

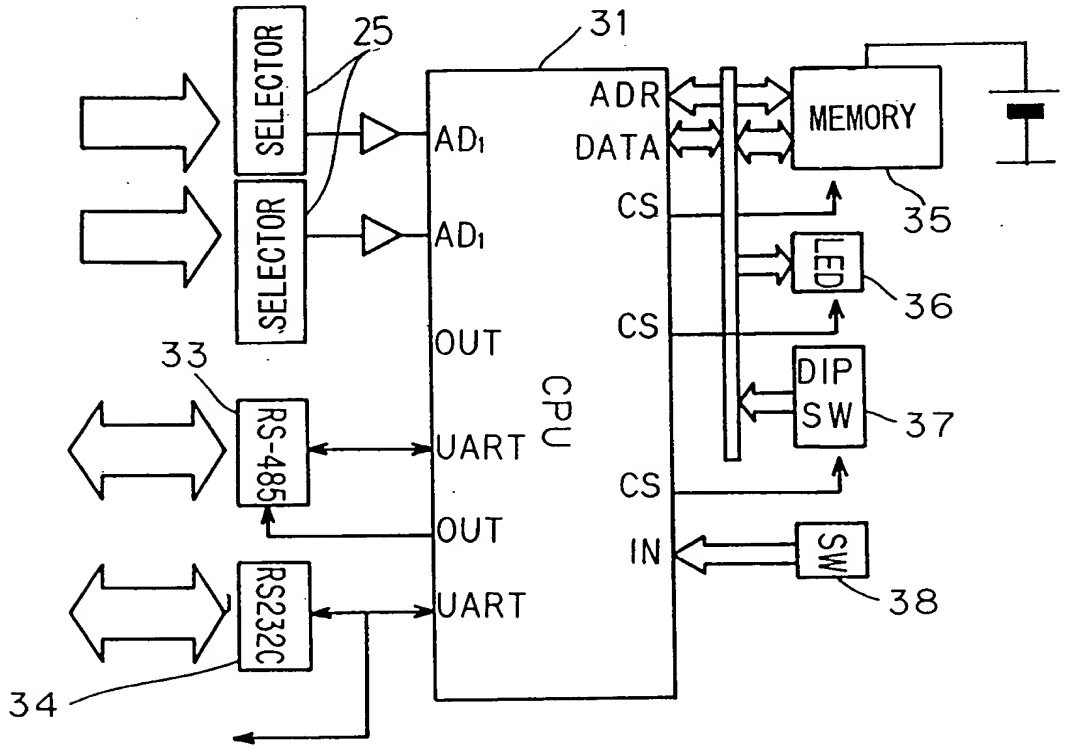

SELECTOR
SELECTOR
25
31
AD1
AD1
OUT
UART
OUT
UART
CPU
ADR
DATA
CS
CS
CS
IN
MEMORY
35
LED
36
DIP SW
37
SW
38
33
RS-485
RS232C
34

Fig. 10

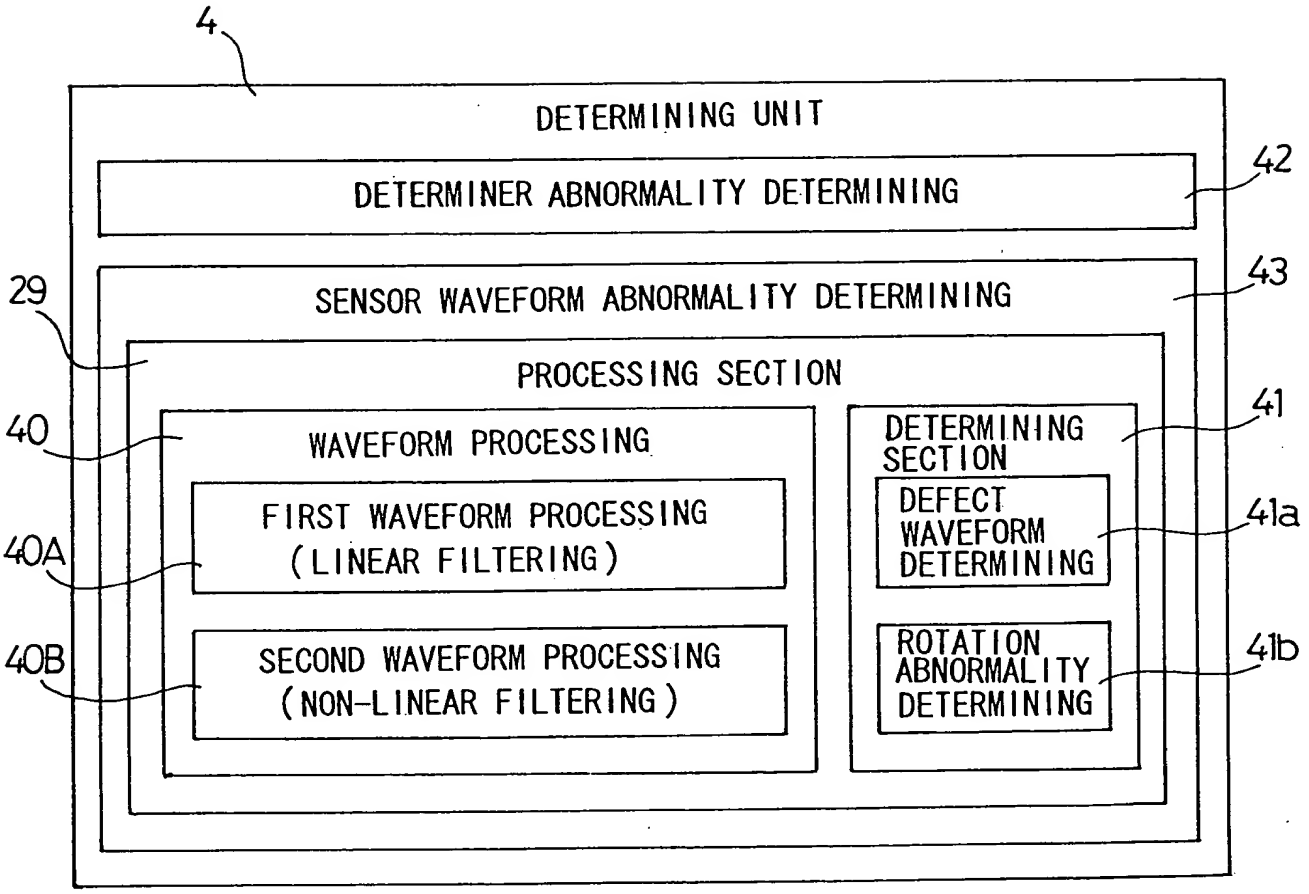

4
DETERMINING UNIT
DETERMINER ABNORMALITY DETERMINING
42
29
SENSOR WAVEFORM ABNORMALITY DETERMINING
43
PROCESSING SECTION
40
WAVEFORM PROCESSING
41
DETERMINING SECTION
FIRST WAVEFORM PROCESSING (LINEAR FILTERING)
40A
DEFECT WAVEFORM DETERMINING
41a
SECOND WAVEFORM PROCESSING (NON-LINEAR FILTERING)
40B
ROTATION ABNORMALITY DETERMINING
41b

Fig. 11

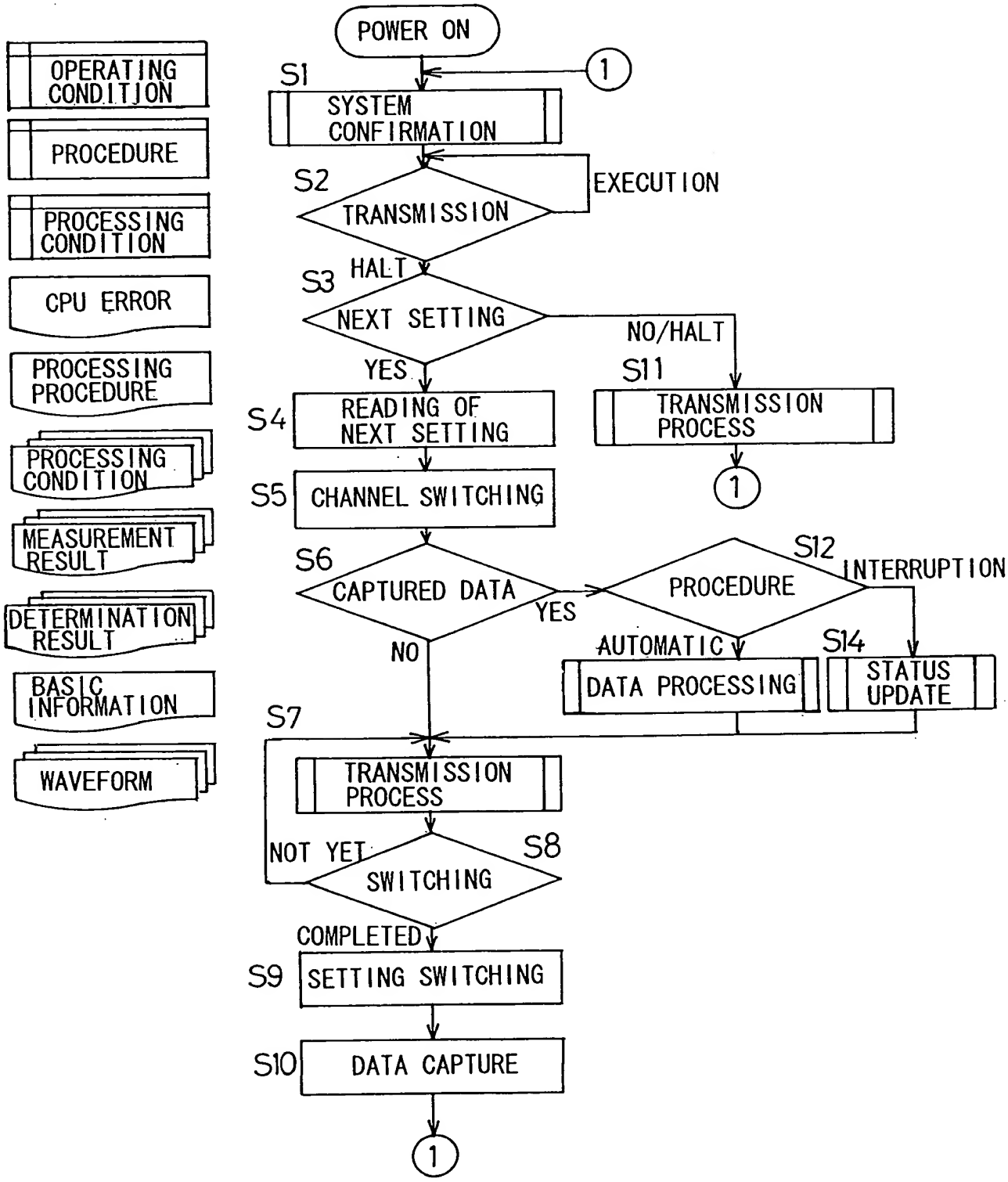

OPERATING CONDITION
PROCEDURE
PROCESSING CONDITION
CPU ERROR
PROCESSING PROCEDURE
PROCESSING CONDITION
MEASUREMENT RESULT
DETERMINATION RESULT
BASIC INFORMATION
WAVEFORM
POWER ON
1
S1
SYSTEM CONFIRMATION
S2
TRANSMISSION
EXECUTION
HALT
S3
NEXT SETTING
NO/HALT
YES
S11
TRANSMISSION PROCESS
1
S4
READING OF NEXT SETTING
S5
CHANNEL SWITCHING
S6
CAPTURED DATA
YES
S12
PROCEDURE
INTERRUPTION
NO
AUTOMATIC
S14
DATA PROCESSING
STATUS UPDATE
S7
TRANSMISSION PROCESS
NOT YET
S8
SWITCHING
COMPLETED
S9
SETTING SWITCHING
S10
DATA CAPTURE
1

Fig. 12

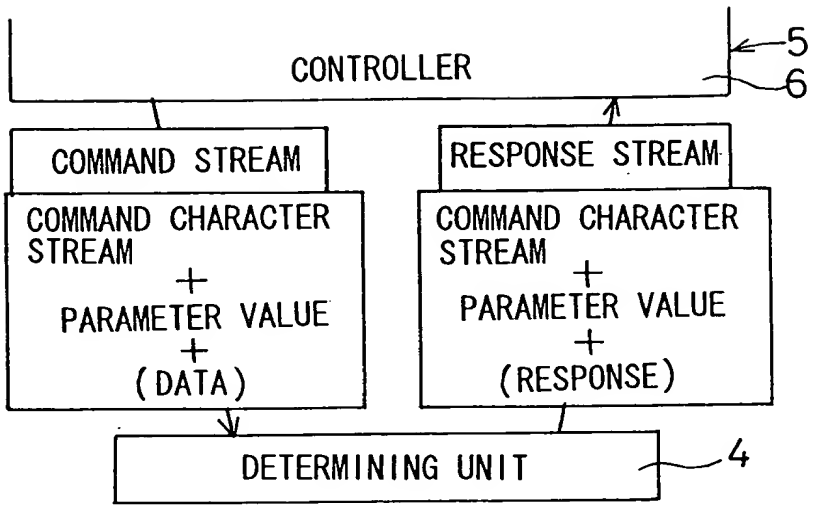

CONTROLLER
5
6
COMMAND STREAM
RESPONSE STREAM
COMMAND CHARACTER STREAM
+
PARAMETER VALUE
+
(DATA)
COMMAND CHARACTER STREAM
+
PARAMETER VALUE
+
(RESPONSE)
DETERMINING UNIT
4

Fig. 13

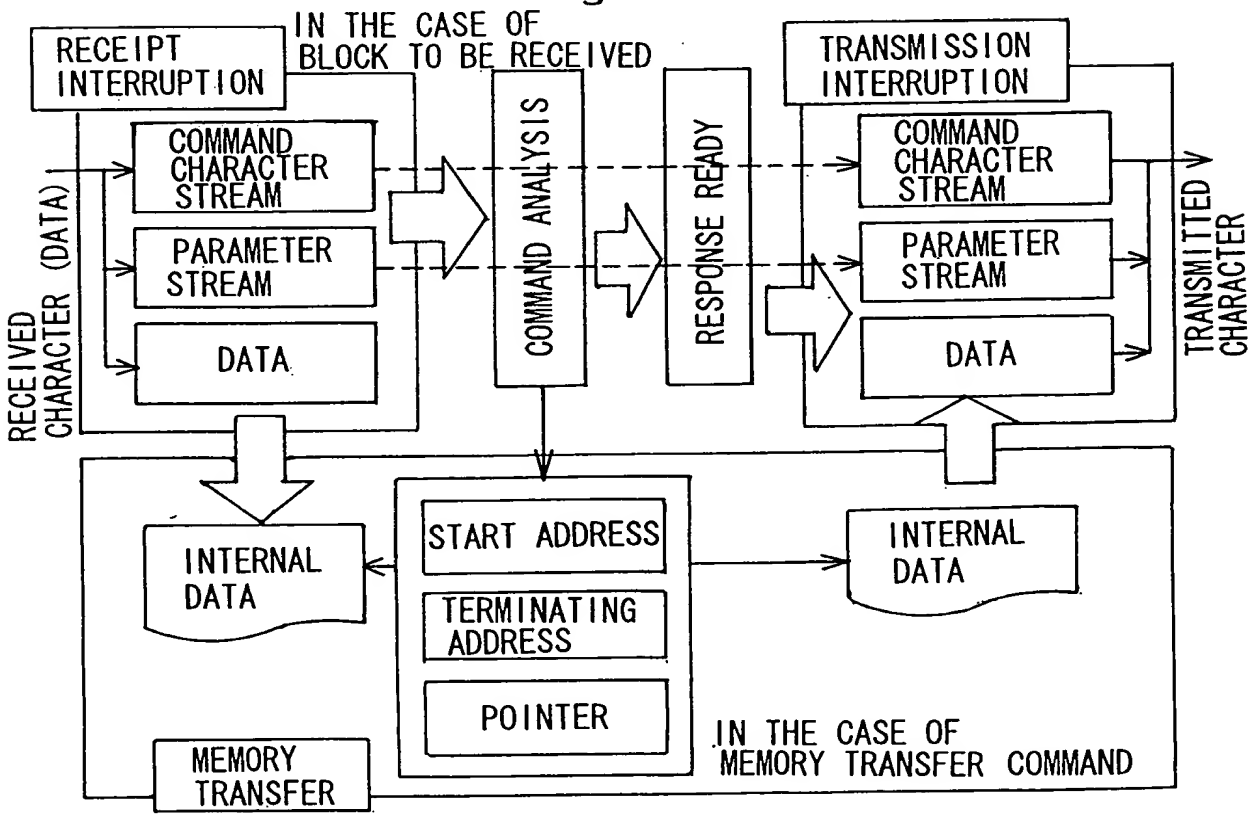

RECEIPT INTERRUPTION
IN THE CASE OF BLOCK TO BE RECEIVED
TRANSMISSION INTERRUPTION
RECEIVED CHARACTER (DATA)
COMMAND CHARACTER STREAM
PARAMETER STREAM
DATA
COMMAND ANALYSIS
RESPONSE READY
COMMAND CHARACTER STREAM
PARAMETER STREAM
DATA
TRANSMITTED CHARACTER
INTERNAL DATA
START ADDRESS
TERMINATING ADDRESS
POINTER
INTERNAL DATA
MEMORY TRANSFER
IN THE CASE OF MEMORY TRANSFER COMMAND

Fig 14A

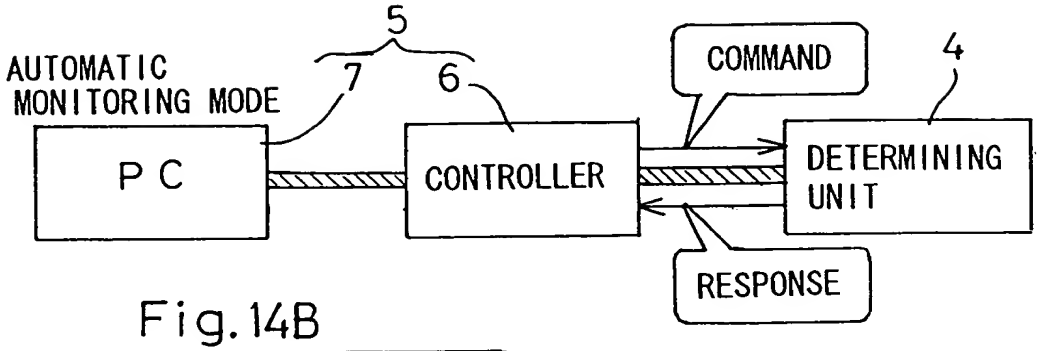


Fig.14B

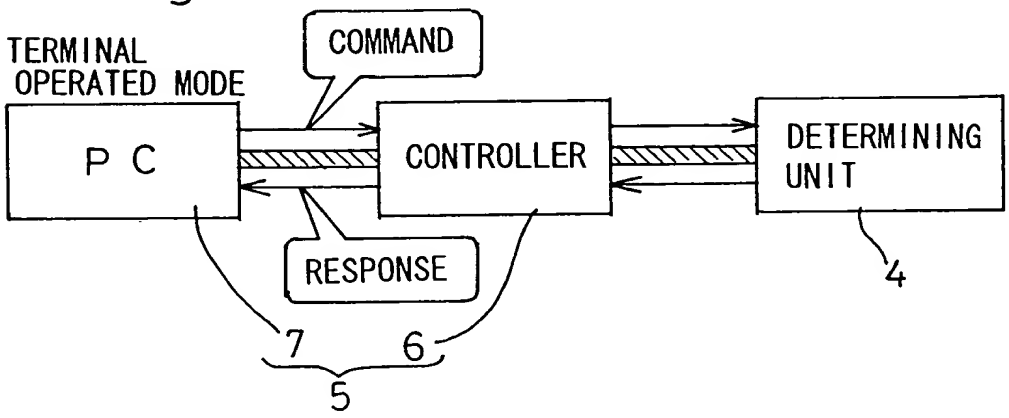


Fig.15

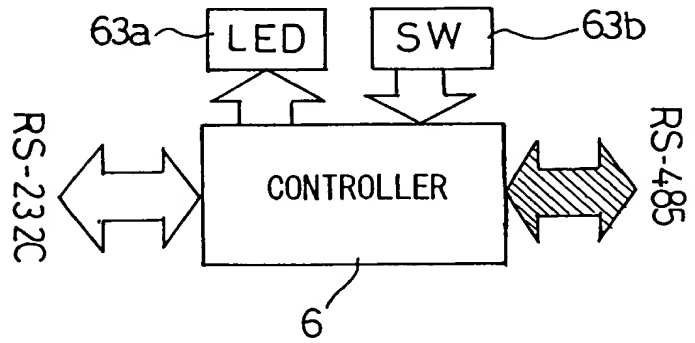


Fig.16

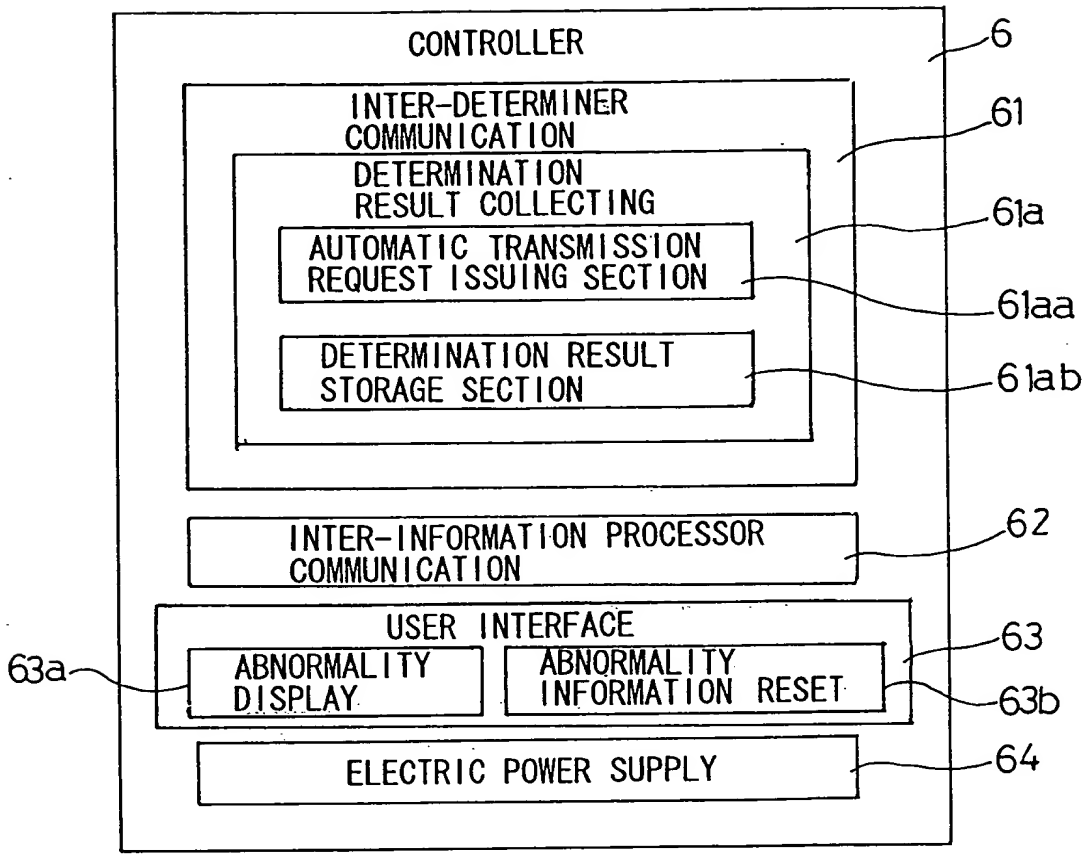


Fig.17A

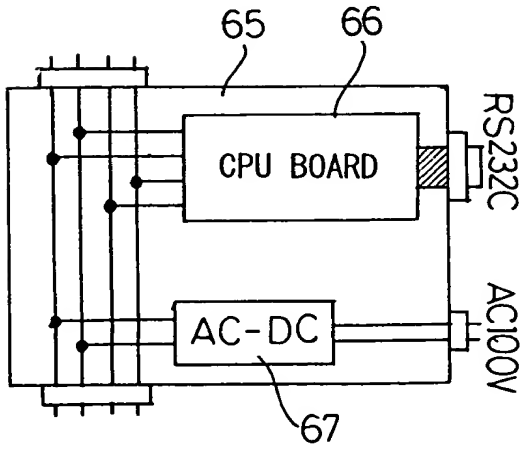


Fig.17B

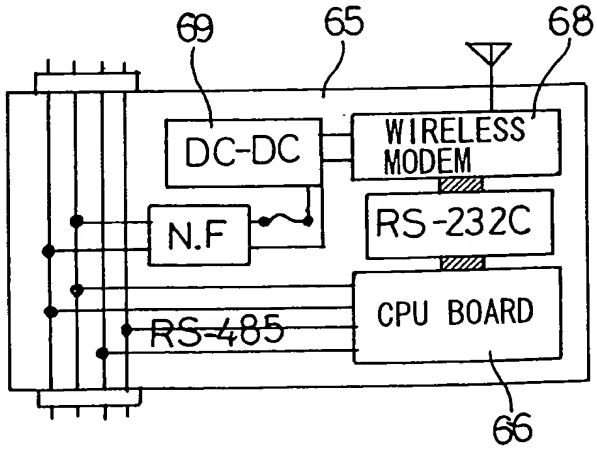


Fig. 18

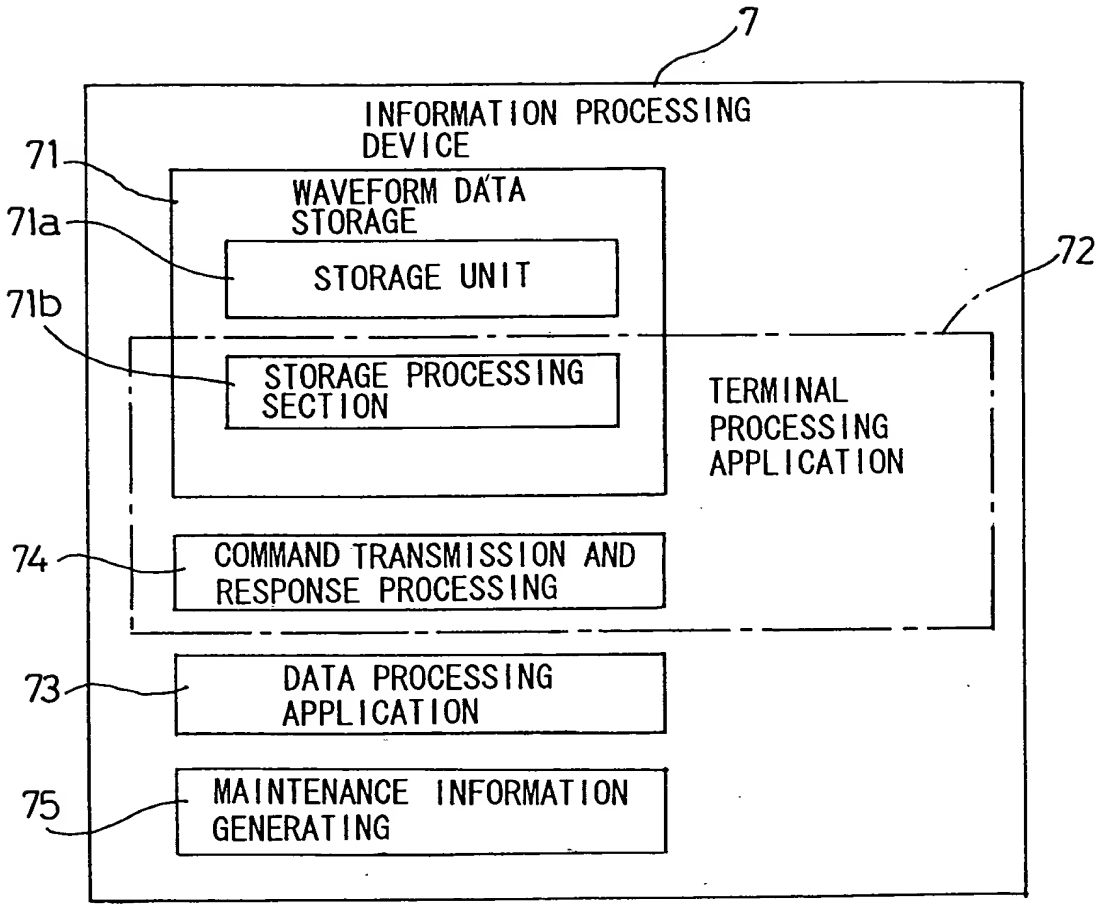

7
INFORMATION PROCESSING DEVICE
71
WAVEFORM DATA STORAGE
71a
STORAGE UNIT
71b
STORAGE PROCESSING SECTION
72
TERMINAL PROCESSING APPLICATION
74
COMMAND TRANSMISSION AND RESPONSE PROCESSING
73
DATA PROCESSING APPLICATION
75
MAINTENANCE INFORMATION GENERATING

Fig.19

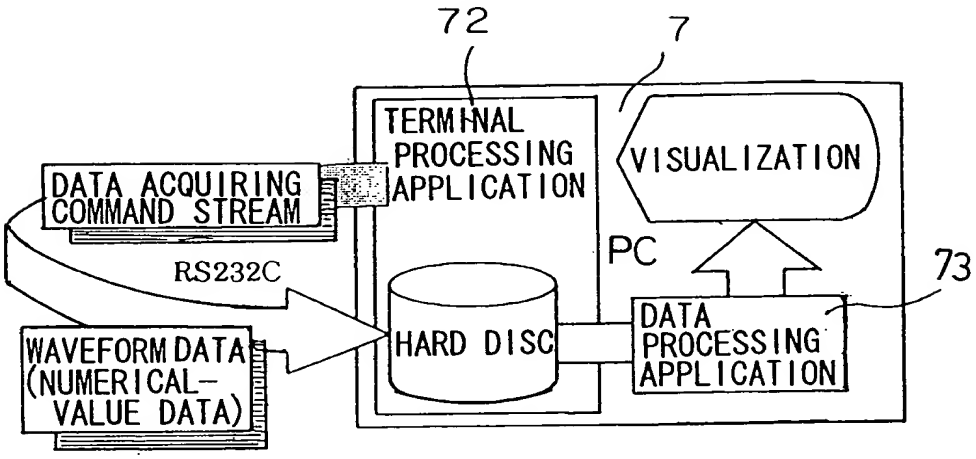

72
7
TERMINAL PROCESSING APPLICATION
VISUALIZATION
DATA ACQUIRING COMMAND STREAM
PC
RS232C
73
HARD DISC
DATA PROCESSING APPLICATION
WAVEFORM DATA (NUMERICAL-VALUE DATA)

Fig.20

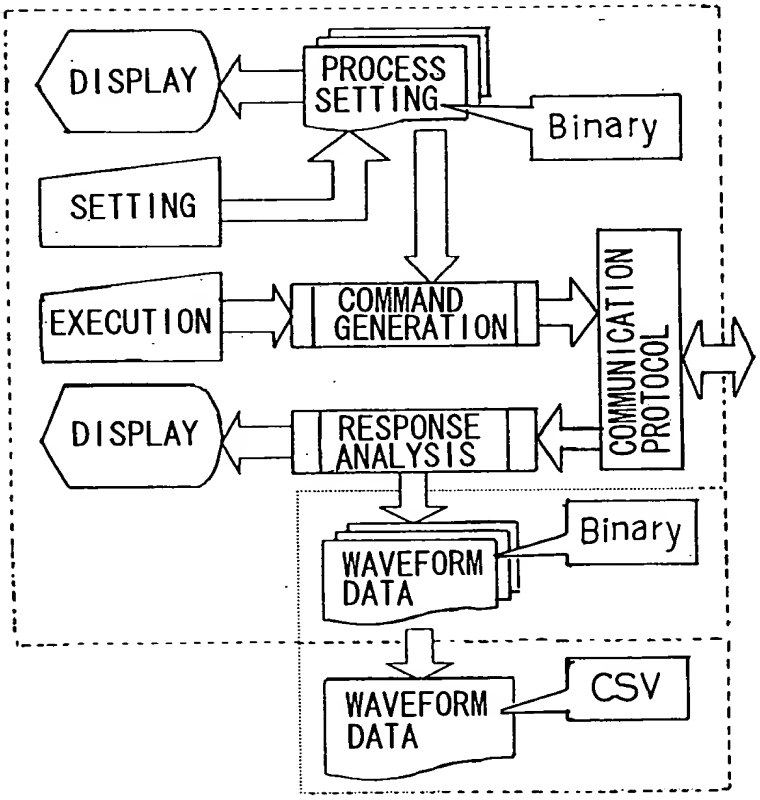

DISPLAY
PROCESS SETTING
Binary
SETTING
EXECUTION
COMMAND GENERATION
COMMUNICATION PROTOCOL
DISPLAY
RESPONSE ANALYSIS
Binary
WAVEFORM DATA
CSV
WAVEFORM DATA

Fig. 21

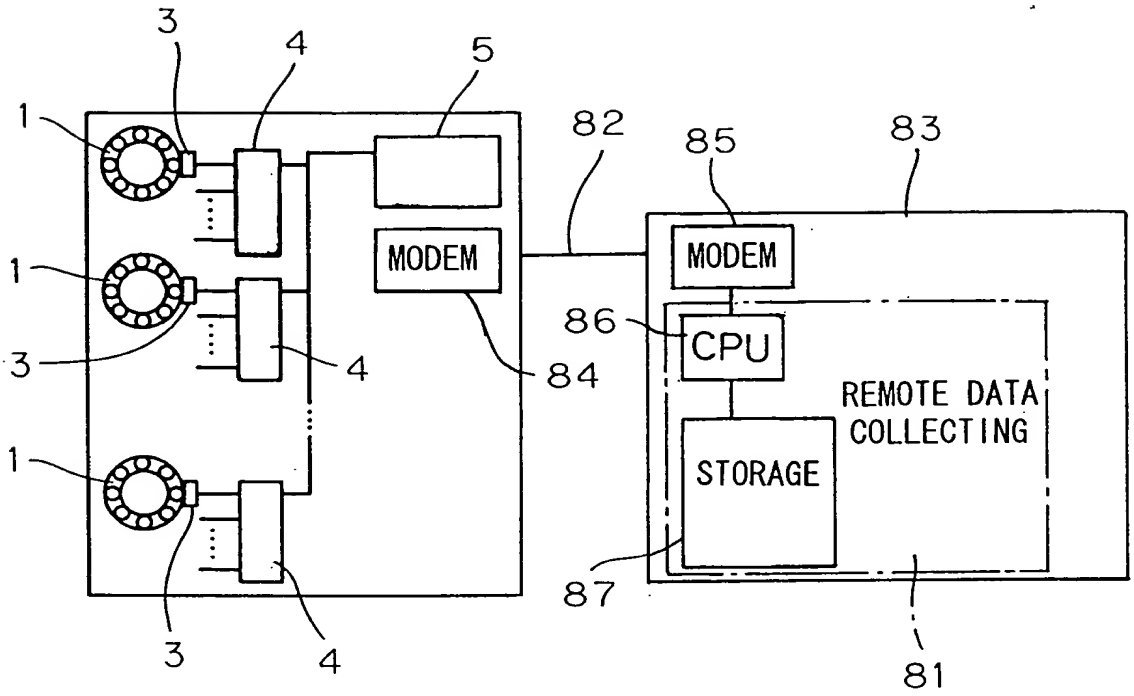

3
4
5
1
82
85
83
MODEM
MODEM
1
86
CPU
3
4
84
REMOTE DATA
COLLECTING
1
STORAGE
87
3
4
81

Fig. 22

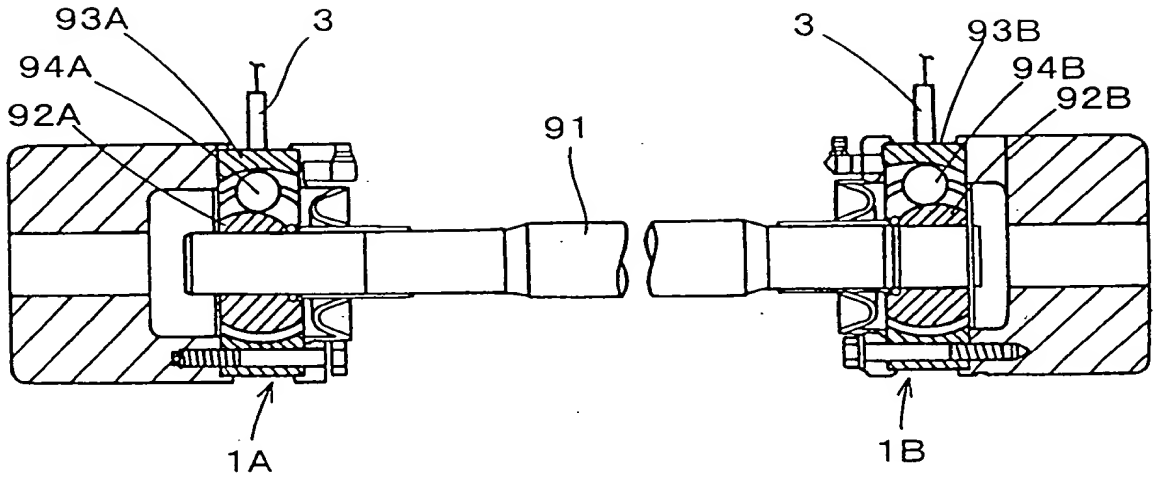


Fig. 23

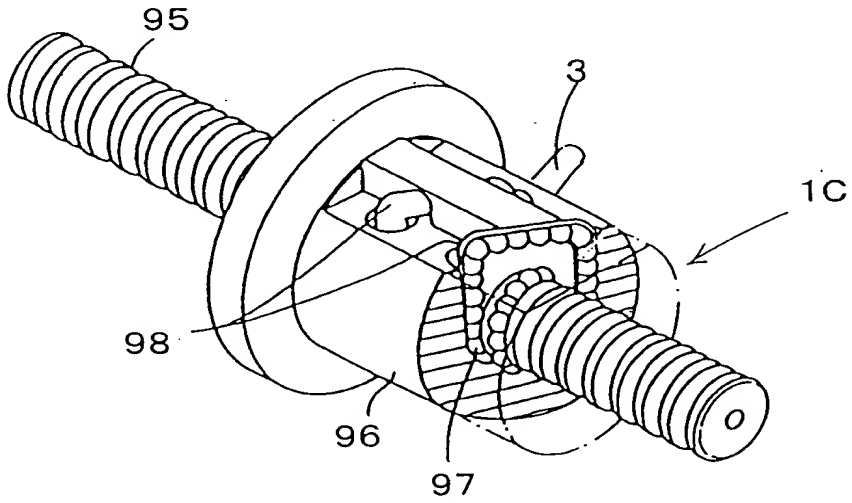
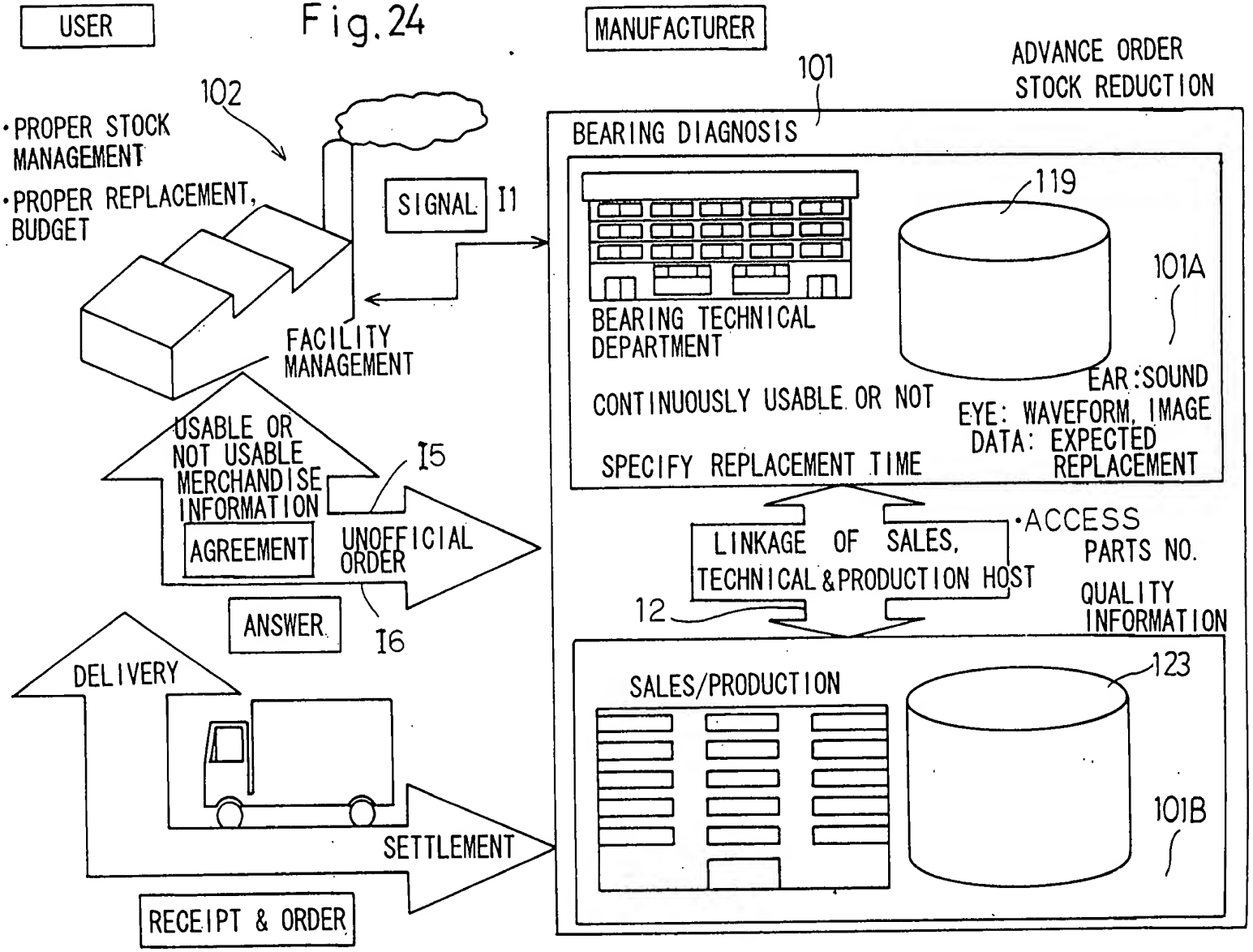


Fig.24


USER
MANUFACTURER
ADVANCE ORDER
STOCK REDUCTION
101
102
·PROPER STOCK MANAGEMENT
·PROPER REPLACEMENT, BUDGET
SIGNAL I1
FACILITY MANAGEMENT
BEARING DIAGNOSIS
119
101A
BEARING TECHNICAL DEPARTMENT
EAR:SOUND
EYE: WAVEFORM, IMAGE
DATA: EXPECTED REPLACEMENT
CONTINUOUSLY USABLE OR NOT
SPECIFY REPLACEMENT TIME
USABLE OR NOT USABLE MERCHANDISE INFORMATION
I5
AGREEMENT
UNOFFICIAL ORDER
ANSWER
I6
·ACCESS PARTS NO.
LINKAGE OF SALES, TECHNICAL & PRODUCTION HOST
12
QUALITY INFORMATION
DELIVERY
SALES/PRODUCTION
123
101B
SETTLEMENT
RECEIPT & ORDER

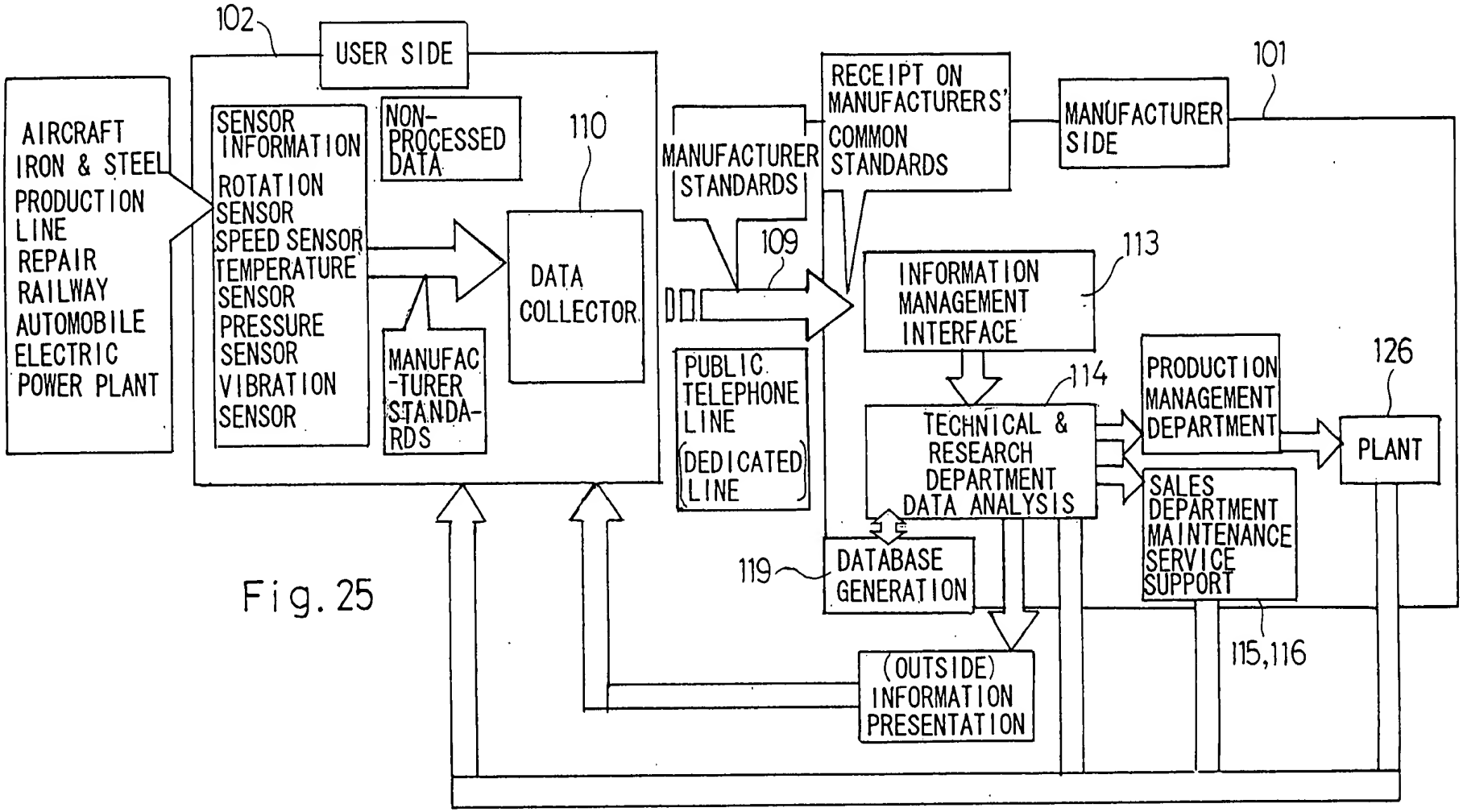

102
USER SIDE
AIRCRAFT
IRON & STEEL
PRODUCTION
LINE
REPAIR
RAILWAY
AUTOMOBILE
ELECTRIC
POWER PLANT
SENSOR INFORMATION
ROTATION SENSOR
SPEED SENSOR
TEMPERATURE SENSOR
PRESSURE SENSOR
VIBRATION SENSOR
NON-PROCESSED DATA
MANUFAC-TURER STANDA-RDS
110
DATA COLLECTOR
MANUFACTURER STANDARDS
RECEIPT ON MANUFACTURERS' COMMON STANDARDS
101
MANUFACTURER SIDE
109
PUBLIC TELEPHONE LINE (DEDICATED LINE)
113
INFORMATION MANAGEMENT INTERFACE
114
TECHNICAL & RESEARCH DEPARTMENT DATA ANALYSIS
PRODUCTION MANAGEMENT DEPARTMENT
126
PLANT
SALES DEPARTMENT MAINTENANCE SERVICE SUPPORT
115,116
119
DATABASE GENERATION
(OUTSIDE) INFORMATION PRESENTATION

Fig. 25

Fig. 26

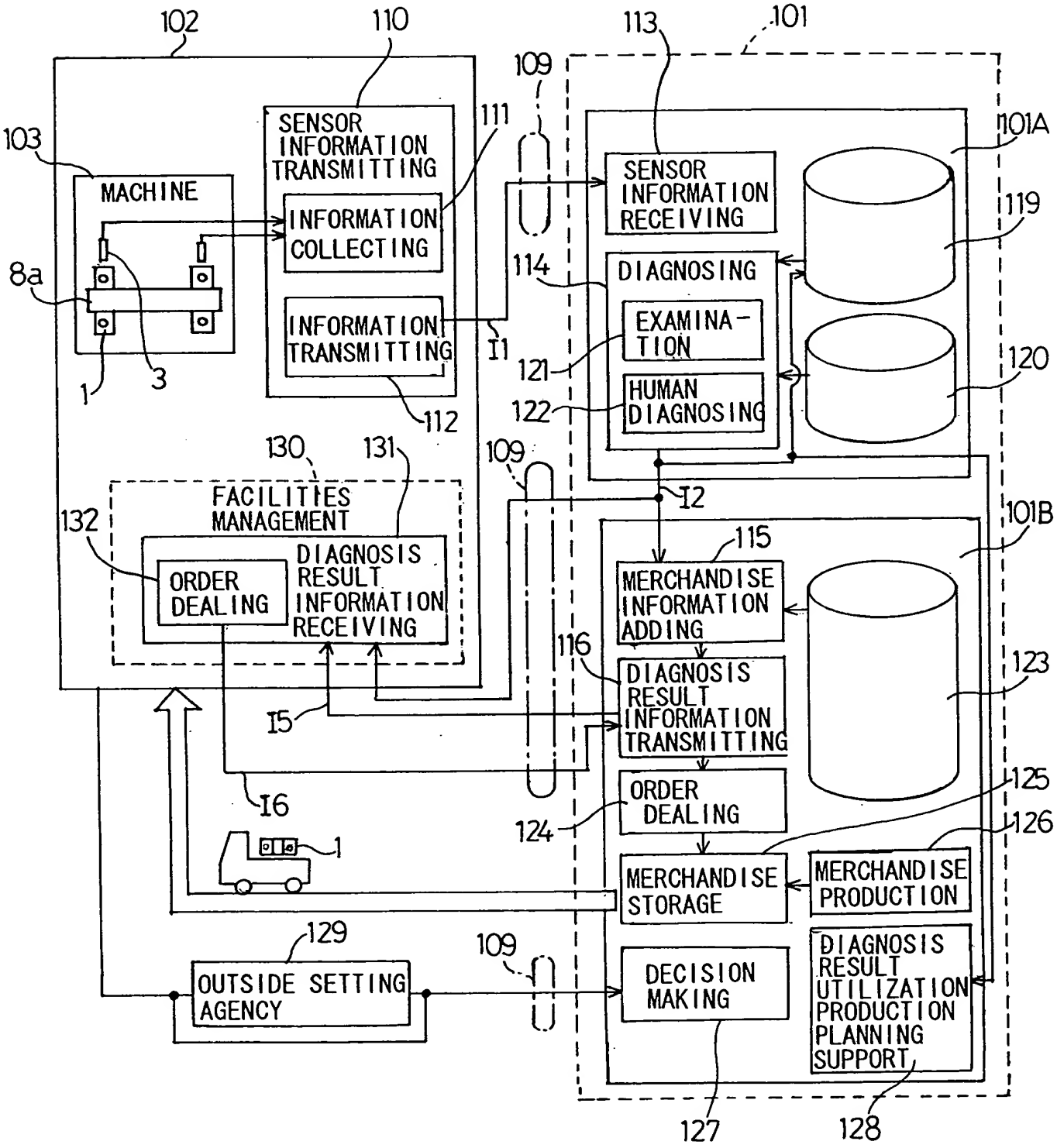

102
110
113
101
109
103
SENSOR INFORMATION TRANSMITTING
111
101A
MACHINE
SENSOR INFORMATION RECEIVING
119
INFORMATION COLLECTING
8a
114
DIAGNOSING
EXAMINATION
INFORMATION TRANSMITTING
I1
121
120
HUMAN DIAGNOSING
122
1
3
112
130
131
109
FACILITIES MANAGEMENT
I2
101B
132
115
ORDER DEALING
DIAGNOSIS RESULT INFORMATION RECEIVING
MERCHANDISE INFORMATION ADDING
116
123
DIAGNOSIS RESULT INFORMATION TRANSMITTING
I5
I6
ORDER DEALING
125
124
126
1
MERCHANDISE STORAGE
MERCHANDISE PRODUCTION
129
109
OUTSIDE SETTING AGENCY
DECISION MAKING
DIAGNOSIS RESULT UTILIZATION PRODUCTION PLANNING SUPPORT
127
128

Fig. 27

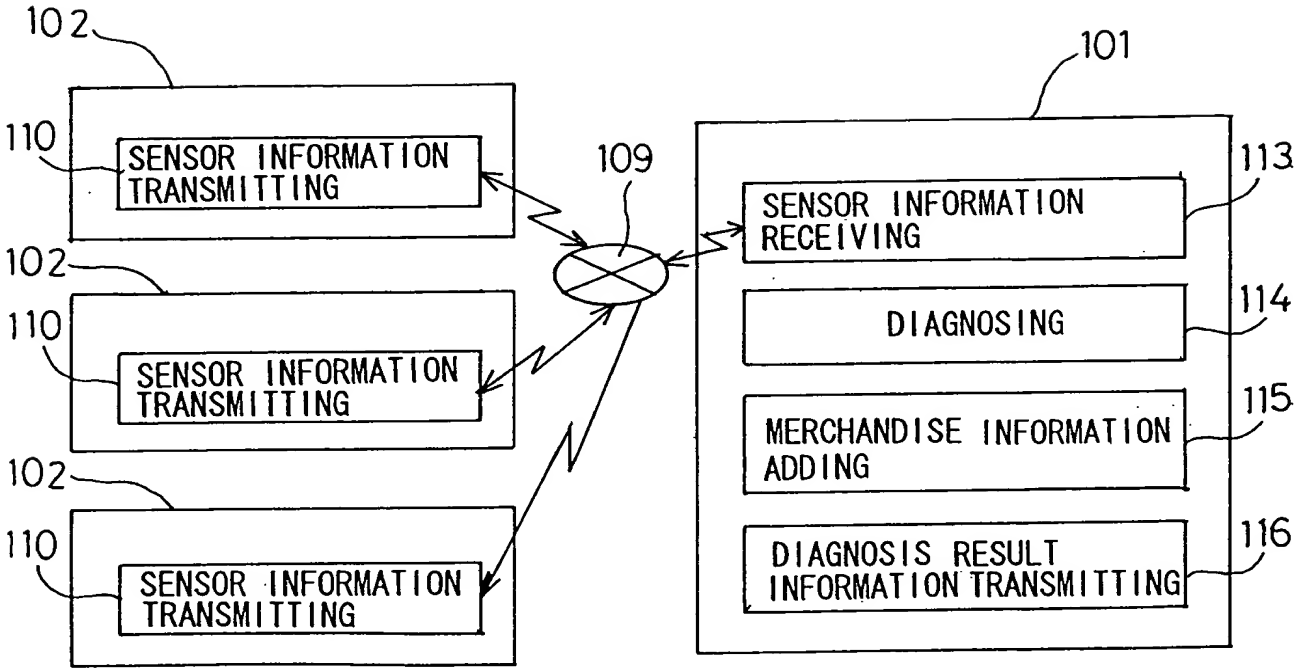

102
110
SENSOR INFORMATION TRANSMITTING
102
110
SENSOR INFORMATION TRANSMITTING
102
110
SENSOR INFORMATION TRANSMITTING
109
101
113
SENSOR INFORMATION RECEIVING
114
DIAGNOSING
115
MERCHANDISE INFORMATION ADDING
116
DIAGNOSIS RESULT INFORMATION TRANSMITTING

Fig.28

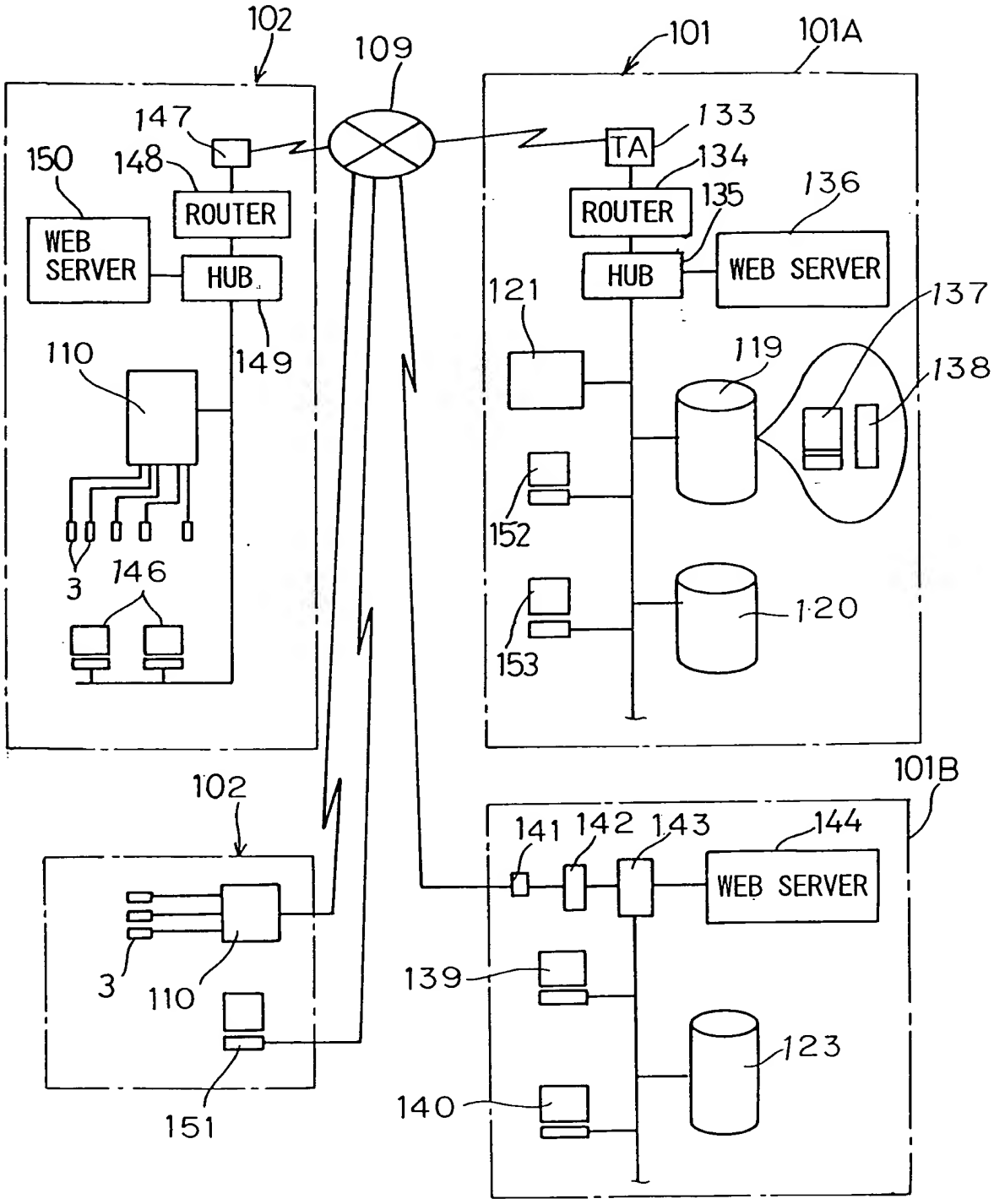

102
109
101
101A
147
133
TA
150
148
134
ROUTER
135
136
ROUTER
WEB SERVER
HUB
HUB
WEB SERVER
121
137
119
138
110
149
152
3
146
153
120
102
101B
141
142
143
144
WEB SERVER
3
110
139
123
151
140

Fig. 29A

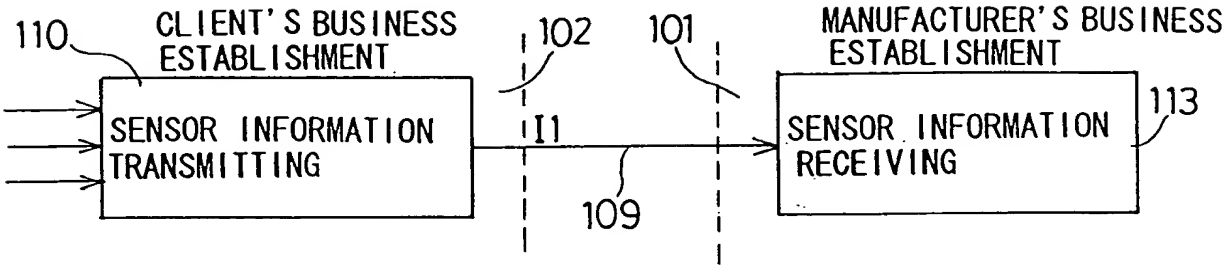


Fig. 29B

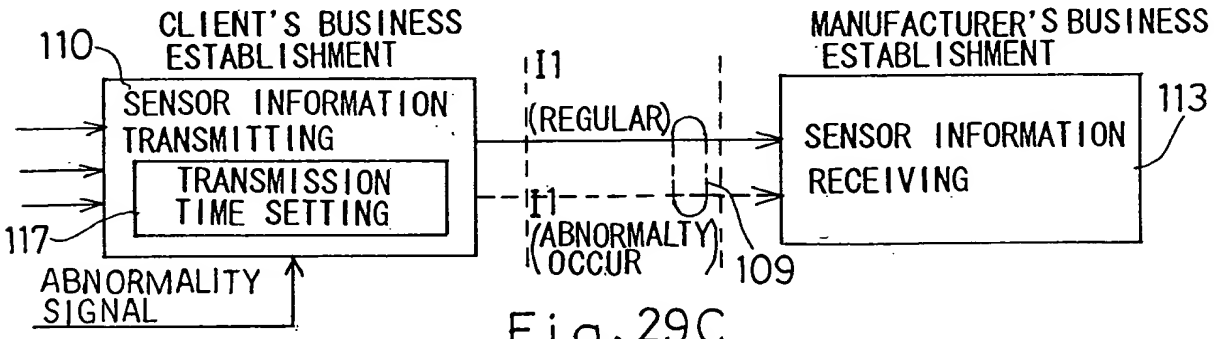


Fig. 29C

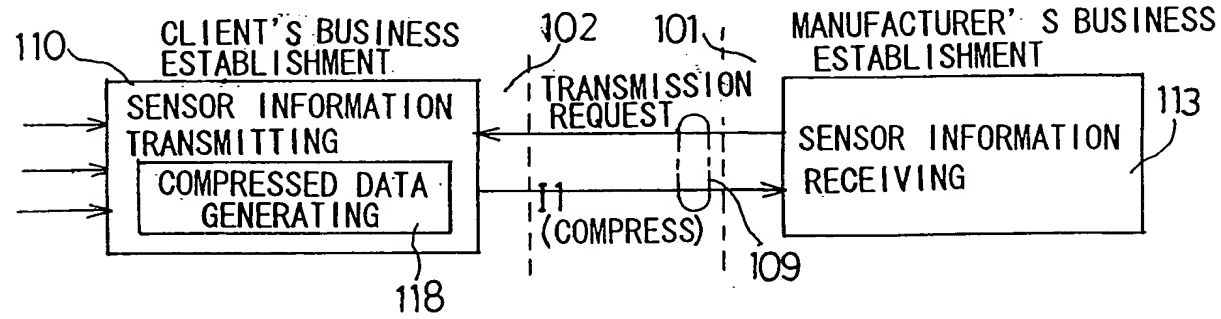
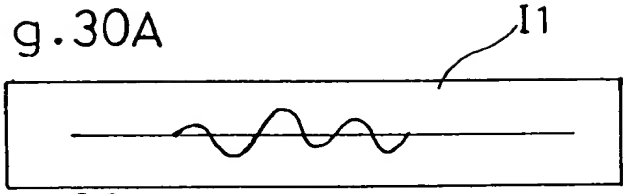


Fig.30A



COMPONENT-SPECIFIC INFORMATION ADDED

Fig.30B

- COMPONENT-SPECIFIC INFORMATION
- USABLE
- NOT USABLE
- USABLE TERM
- HUMAN DIAGNOSIS INFORMATION

I2

Fig.30C

I3 I4

DIAGNOSIS RESULT INFORMATION	MERCHANDISE INFORMATION	ORDER QUERY INFORMATION
12 15	PRICE INFORMATION DELIVERY INFORMATION (AVAILABLE, NOT AVAILABLE) REPAIR INFORMATION (REPAIRABLE)	ORDER/SUSPENSION EXPECTED DELIVERY DATE

Fig.30D

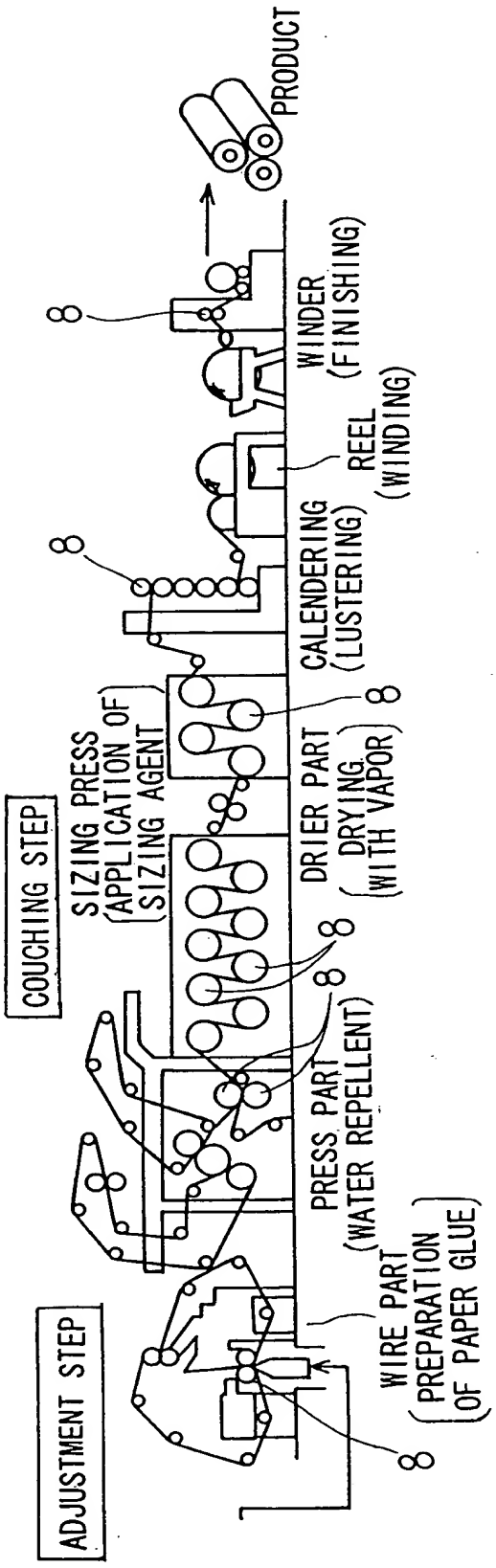
ORDER THOUGHT EXPECTED DELIVERY DATE — I6

Fig.31

MERCHANDISE ADDED DIAGNOSIS RESULT INFORMATION GROUP

COMPONENT -SPECIFIC INFORMATION	DIAGNOSIS RESULT INFORMATION	MERCHANDISE INFORMATION	ORDER QUERY INFORMATION	
ITEM NO.00	.....	.....	.....	←I15
ITEM NO.00	.....	.....	.....	←I15
ITEM NO.00	.....	.....	.....	

Fig. 32


ADJUSTMENT STEP
COUCHING STEP
WIRE PART (PREPARATION OF PAPER GLUE)
PRESS PART (WATER REPELLENT)
SIZING PRESS (APPLICATION OF SIZING AGENT)
DRIER PART (DRYING WITH VAPOR)
CALENDERING (LUSTERING)
REEL (WINDING)
WINDER (FINISHING)
PRODUCT
8

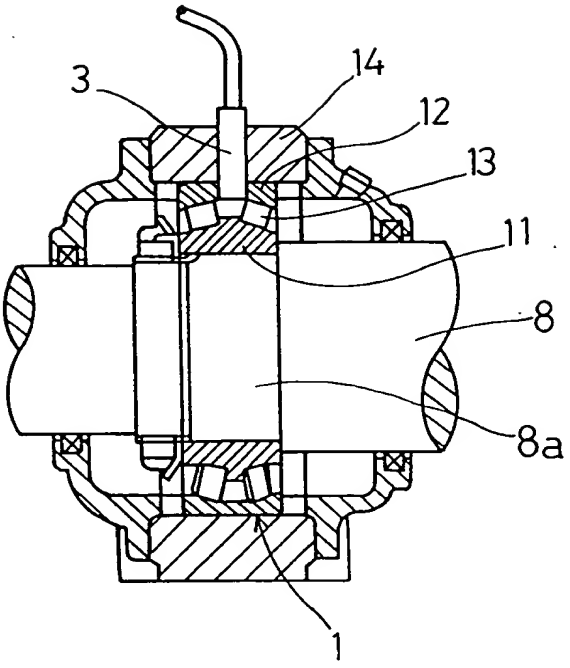



Fig. 33